

## Introduction

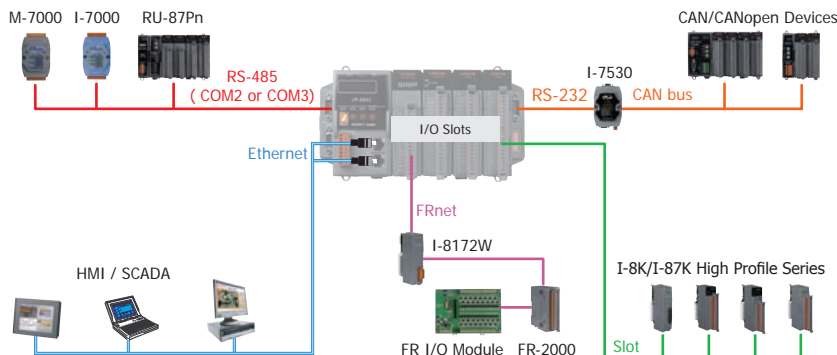
iPAC-8xx7 Series (iP-8417/8817/8447/8847) is the ISaGRAF SoftLogic PAC of ICP DAS iPAC-8000 series. It is equipped an 80186, 80 MHz CPU running a MiniOS7 operating system, various connectivity (Dual 10/100 Base-TX Ethernet Ports for iP-8x47, one RS-232/485 port, one RS-485 port and two RS-232 ports) and 4/8 slots for high performance Parallel I/O modules (high profile I-8K series) and high performance Serial I/O modules (Hot-Swap high profile I-87K I/O modules). Users can also choose RS-485 Remote I/O modules (I-7000 series) or expansion units (RU-87Pn or I-87Kn) plugged with high profile I-87K serial I/O modules. Compared to I-8xx7, iPAC-8xx7 series is 2 ~ 4 times faster!

The iPAC-8xx7 Series supports ISaGRAF Ver.3 Workbench:

- IEC 61131-3 Standard Open PLC Programming Languages (LD, FBD, SFC, ST, IL, FC) + Flow Chart (FC)
- Auto-Scan I/O
- On-Line debug/control/monitor, off-line simulation
- Simple graphic HMI

## Applications

### Rich I/O Expansion Ability



## Highlight Information

- ISaGRAF Ver.3 SoftLogic: Five IEC 61131-3 Standard Open PLC Languages + Flow Chart
- 80186, 80 MHz CPU (16 bits)
- 512 KB Battery Backup SRAM to Retain Data
- 64-bit Hardware Serial Number
- 4/8 Hot-Swap Slots for I-87K High Profile I/O Modules
- Dual 10/100M Ethernet Ports (for iP-8447/8847)
- 4 Serial Ports (RS-232/485)
- Redundant Power Inputs
- Operating Temperature: -25 ~ +75 °C



## Features

### Software

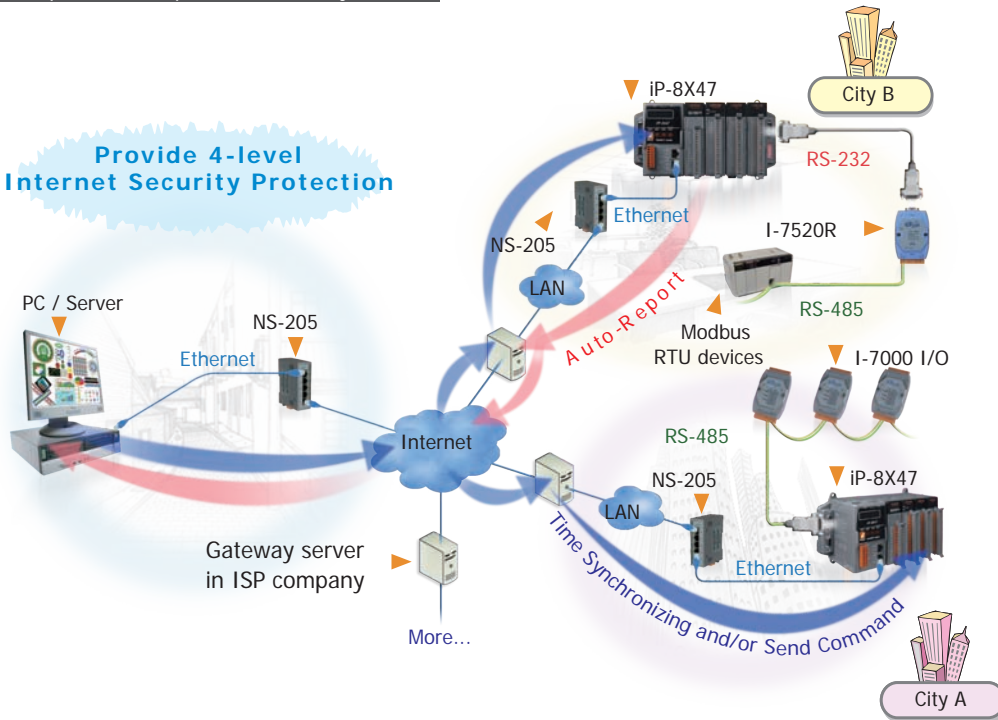
- MiniOS7 Embedded Operating System (DOS-like)
- Development Software: ISaGRAF Ver.3
- Redundant Ethernet Communication (for iP-8x47)
- Support Modbus RTU/ASCII Master & Modbus RTU/TCP Slave
- Support Data Exchange
- Support CAN/CANopen
- Support FRnet I/O (via I-8172W)
- Support Motion Control
- Support Send Email with One File
- Support SMS: Short Message Service
- Support GPS, ZigBee & Radio Wireless communication
- Support Data-Recorder & Data-Logger
- Support Auto-report Acquisition Data & Control

### Hardware

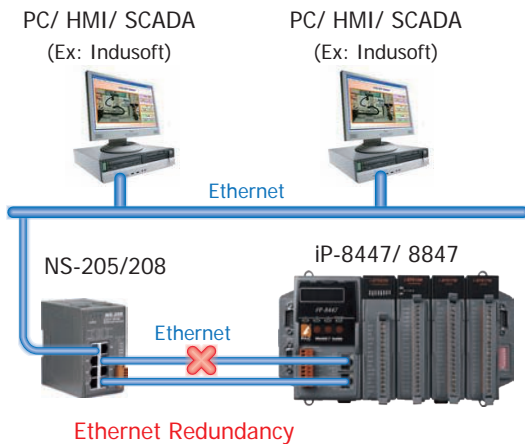
- Powerful CPU Module: 80186, 80 MHz
- Large SRAM: 768 KB for iP-8x47  
SRAM: 512 for iP-8x17
- 512 KB FLASH Memory
- 16 KB EEPROM
- Support RTC
- Rich Communication Interface: RS-232/485, Ethernet
- 4/8 I/O Slots accept Parallel/Serial I/O board
- Hot-Swap High Profile I-87K I/O Ability
- Watchdog Timer Increase Reliability
- Dual Battery-Backup SRAM (512 KB)
- Dual Ethernet Ports (For iP-8x47)
- Redundant Power Inputs
- DIN-Rail or Wall Mounting
- Operating Temperature: -25 ~ +75 °C

## Cost-effective Auto-Report Data Acquisition/Control System

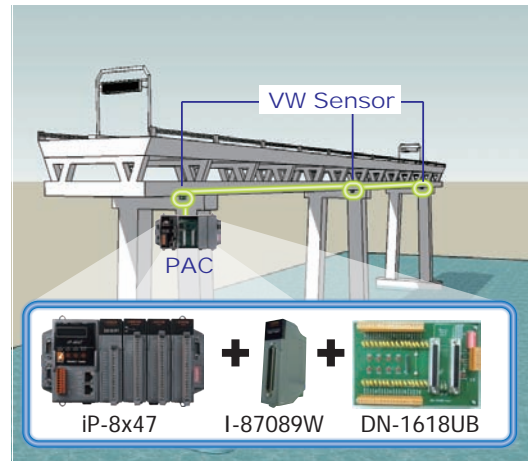
## Provide 4-level Internet Security Protection



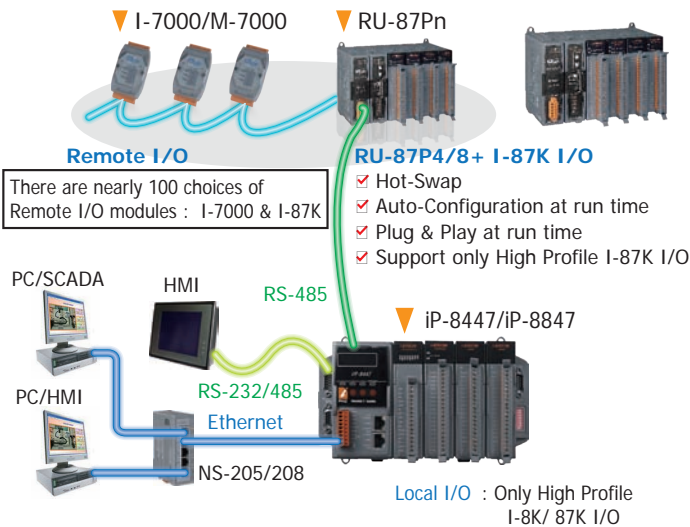
## Ethernet Redundancy for HMI/PC/SCADA



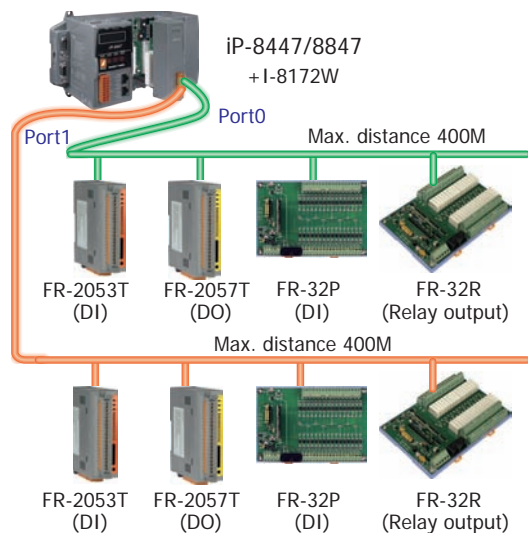
## Stress Monitoring of Constructions



## Local/Remote I/O Expansion &amp; Multi-HMI



## Fast FRnet Remote I/O



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Compact PAC

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iPAC-8000 Series

iP-8417/8817/8447/8847

## PAC Specifications

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Compact PAC

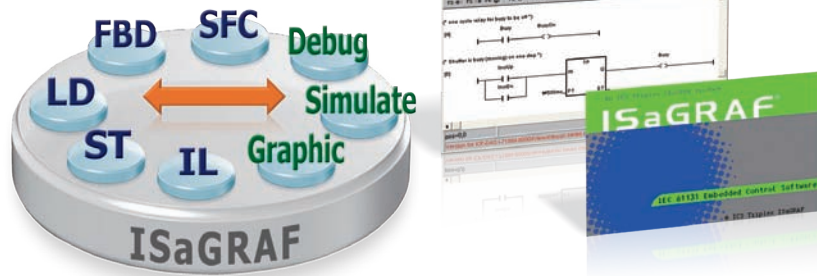
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iPAC-8000 Series

iP-8417/8817/8447/8847

Models		iP-8417	iP-8447	iP-8817	iP-8847
System Software					
OS		MiniOS7 (DOS-like embedded operating system)			
Development Software					
ISaGRAF Software	ISaGRAF Version 3	IEC 61131-3 standard			
	Languages	LD, ST, FBD, SFC, IL & FC			
	Max. Code Size	64 KB			
	Scan Time	2 ~ 25 ms ms for normal program 10 ~ 125 ms (or more) for complex or large program			
CPU Module					
CPU		80186 or compatible (16-bit and 80 MHz)			
SRAM		768 KB			
Flash		512 KB (100,000 erase/write cycles) with Flash protection switch			
Expansion Flash Memory		microSD socket			
Dual Battery Backup SRAM		512 KB (for 5 years data retain while power off), support up to 1024 retain variables			
EEPROM		16 KB Data Retention: 40 years; 1,000,000 erase/write cycles			
NVRAM		31 bytes (battery backup, data valid up to 5 year			
RTC (Real Time Clock)		Provide second, minute, hour, date, day of week, month, year			
64-bit Hardware Serial Number		Yes, for Software Copy Protection			
Watchdog Timers		Yes (0.8 second)			
NET ID		8-pin DIP switch to assign NET ID as 1 ~ 255			
Communication Ports					
Ethernet		-	RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	-	RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)
COM 0		Internal communication with the high profile I-87K series modules in slots			
COM 1		RS-232 (to update firmware) (Rx/D, Tx/D and GND); non-isolated			
COM 2	RS-485	D+, D-; self-tuner ASIC inside			
	Isolation	3000 V <sub>dc</sub>			
COM 3		RS-232/RS-485 (Rx/D, Tx/D, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated			
COM 4		RS-232 (Rx/D, Tx/D, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated			
SMMI					
5-Digit LED Display		Yes			
3-Programmable LED Indicators		Yes			
4-Push Buttons		Yes			
Buzzer		-	Yes	-	Yes
I/O Expansion Slots					
Slot Number		4 (For High Profile I-8K and I-87K Modules Only)		8	
Hot Swap * Will be available		For High Profile I-87K Modules Only			
Data Bus		8/16 bits			
Address Bus Range		2 K for each slot			
Mechanical					
Dimensions (W x L x H)		231 mm x 132 mm x 111 mm		355 mm x 132 mm x 111 mm	
Installation		DIN-Rail or Wall Mounting			
Environmental					
Operating Temperature		-25 ~ +75 °C			
Storage Temperature		-30 ~ +80 °C			
Ambient Relative Humidity		10 ~ 90% RH (non-condensing)			
Power					
Input Range		+10 ~ +30 V <sub>dc</sub>			
Isolation		1 kV			
Redundant Power Inputs		Yes, with one power relay (1 A @ 24 V <sub>dc</sub> ) for alarm			
Capacity		0.85 A, 5 V supply to CPU and backplane, 5.51 A, 5 V supply to I/O expansion slots, 30 W in total		0.9 A, 5 V supply to CPU and backplane, 5.1 A, 5 V supply to I/O expansion slots, 30 W in total	
Consumption		6.7 W (0.28 A @ 24 V <sub>dc</sub> )		7.2 W (0.3 A @ 24 V <sub>dc</sub> )	

## ISaGRAF Specifications



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Compact PAC

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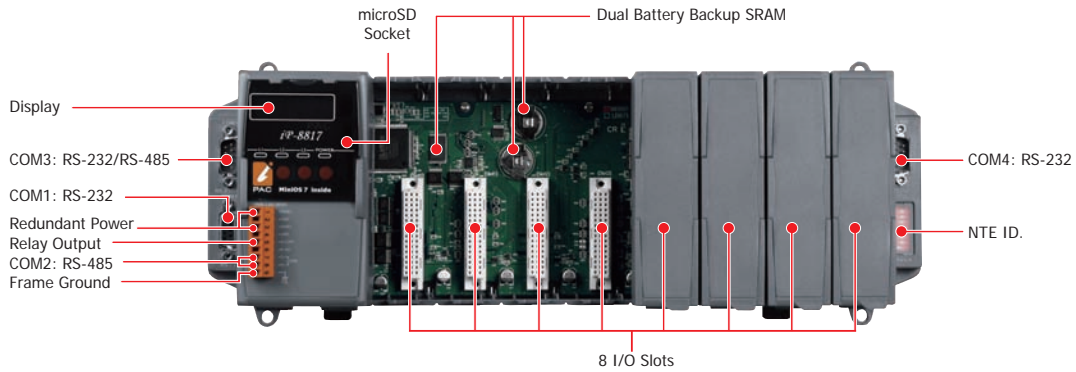
iPAC-8000 Series

iP-8417/8817/8447/8847

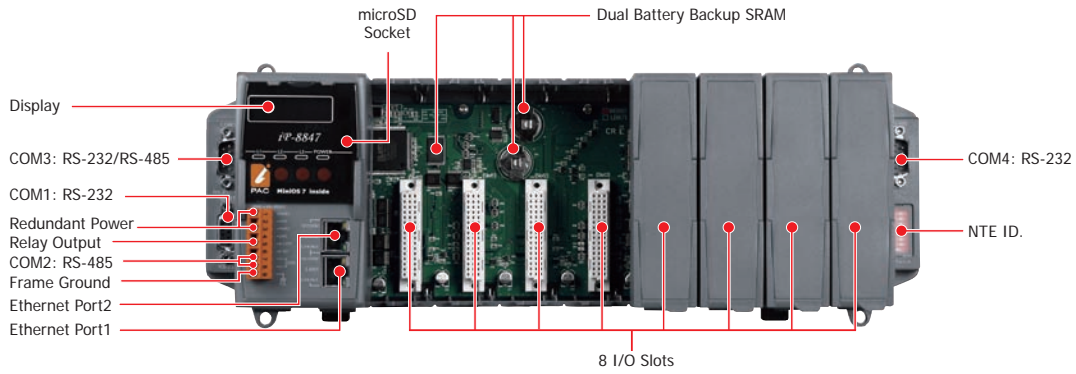
Protocols (some protocols need optional devices)		
Modbus RTU/ASCII Master		Max. 2 COM Ports, COM1 – COM5 can support Modbus RTU Master or ASCII Master protocol to connect to other Modbus Slave devices. Max. Modbus_xxx Function Block amount for 2 ports: 128. (*)
Modbus RTU Slave		Max. 2 COM Ports, COM1 and one of (COM2, COM3) can support Modbus RTU Slave protocol for connecting ISaGRAF, PC/HMI/OPC Server & MMI panels.
Modbus TCP/IP Slave		2 Ethernet ports support Modbus TCP/IP Slave Protocol for connecting ISaGRAF & PC/HMI. (Max. 6 connections)
Remote I/O		One of COM2 or COM3 or COM4 supports I-7000 I/O modules & [(I-87Kn base or RU-87P1/2/4/8) + I-87K High Profile I/O boards] as Remote I/O. Max. 64 Remote I/O module for one PAC
Fbus		Built-in COM3 Port to exchange data between ICP DAS's ISaGRAF PACs.
Ebus		To exchange data between ICP DAS's ISaGRAF Ethernet PACs via Ethernet port. (The LAN2: upper port ONLY)
SMS: Short Message Service		One of COM4/5 can link to a GSM Modem to support SMS. User can request data/control the controller by cellular phone. (*) The controller can also send data & alarms to user's cellular phone. Optional GSM/GPRS modem: GTM-201-RS232 (850/900/1800/1900 GSM/GPRS External Modem)
User-Defined Protocol		COM1 – COM20 by serial communication function blocks (*)
Modem_Link		COM4 can connect a general Modem. Supports PC to remotely download & monitor the controller.
MMICON/LCD		One of COM3 or COM4 supports ICP DAS's MMICON. The MMICON is featured with a 240 x 64 dot LCD and a 4 x 4 Keyboard. User can use it to display picture, string, integer, float, and input a character, string, integer and float.
Redundant Bus7000		Two ISaGRAF PACs can link to remote I-7000 & I-87K High profile I/O modules at the same time. Only one controller is active to control these Remote I/Os. If one is dead, the other one will take over the control of Remote I/Os.
CAN/CANopen		COM1, 3, 4 or COM5 – COM12 can connect one I-7530 (converter: RS-232 to CAN) to support CAN/CANopen devices and sensors. One IP-8x47 supports max. 3 RS-232 ports to connect max. 3 I-7530. (*)
FRnet I/O		Support max. 4 I-8172W FRnet Master cards to connect FRnet I/O modules (Max. 1024-ch. DI + 1024-ch. DO)
Send E-mail		Actively or passively sending E-mail via Ethernet port through internet. Max.10 receivers for each sending and can send E-mail with an attached file. (Max. file size is about 488 KB)
Optional I/O Functions (Refer to ISaGRAF PAC I/O Selection Guide for I/O Module list)		
PWM Output	High Speed PWM Module	I-8088W, 8-ch PWM outputs, software support 1 Hz ~ 100 kHz (non-continuous), duty: 0.1 ~ 99.9%
	DO Module as PWM	8-ch max. for one controller. 500 Hz max. For Off=1 & On=1 ms Output Square Curve: Off: 1 ~ 32767 ms, On: 1 ~ 32767 ms. Optional DO Boards: I-8037W, 8041W, 8041AW, 8042W, 8050W, 8054W, 8055W, 8056W, 8057W, 8060W, 8063W, 8064W, 8068W, 8069W... (Relay Output boards cannot generate fast square pulse)
Counters, Encoder, Frequency	Parallel DI Counter	8 ch. max. for 1 controller. Counter Val: 32-bit.; 500 Hz max. Min. ON & OFF width must >1 ms Optional DI boards: I-8040W, 8040PW, 8042W, 8046W, 8048W, 8050W, 8051W, 8052W, 8053W, 8053PW, 8054W, 8055W, 8058W, 8063W...
	Serial DI Counter	Counter input: 100 Hz max. Counter value: 0 ~ 65535 (16-bit) Optional serial I-87K DI boards: I-87040W, 87046W, 87051W, 87052W, 87053W, 87053W-A5, 87054W, 87055W, 87058W, 87059W, 87063W...
	Remote DI Counter	All I-7000/I-87K DI modules support counters. 100 Hz max. value: 0 ~ 65535
	High Speed Counter	I-87082W: 100 kHz max. 32-bit; I-8084W: 250 kHz max. 32-bit
	Encoder	I-8093W : 3-axis Encoder Module, max. 1M Hz for quadrant input mode, max. 4M Hz for pulse/direction and cw/ccw input mode. I-8084W: 250 kHz max. , 4-ch encoder, can be Dir/Pulse, or Up/Down or A/B phase (Quad. mode); Not support Encoder Z-index.
Motion	Frequency	I-87082W: 2-ch, 1 Hz ~ 100 kHz; I-87088W: 8-ch, 1 Hz ~ 100 kHz; I-8084W: 8-ch, 1 Hz ~ 250 kHz;
	Motion Control	Can integrate with one I-8091W (2-axis) or two I-8091W (4-axis) to do motion control. Ethernet communication is also available when doing motion control.
*Note: COM5 ~ COM20 are resided at the expansion boards if they are plugged on slot0 ~ 7 of iP-8xx7.		

## Appearance

iP-8817

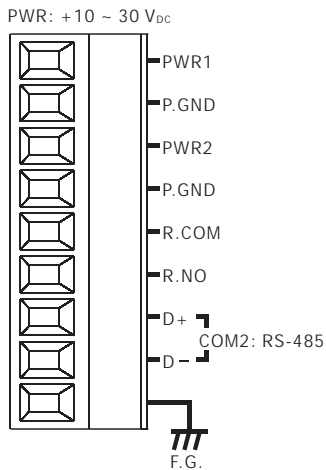


iP-8847



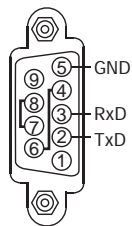
## Pin Assignments

Terminal Block

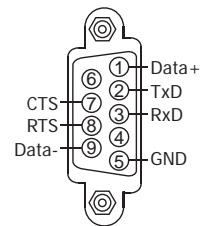


COM Port

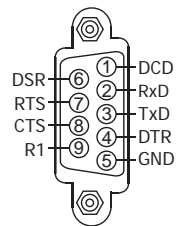
COM1: RS-232



COM3: RS-232/RS-485



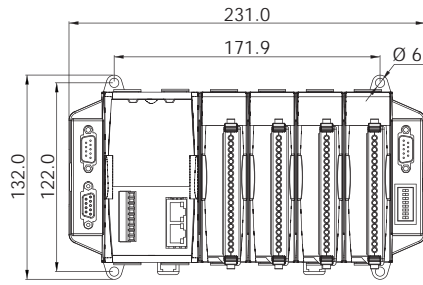
COM4: RS-232



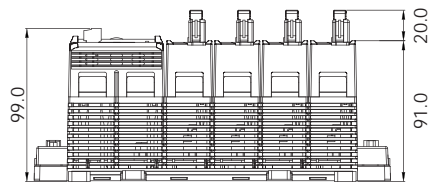


## Dimensions (Unit: mm)

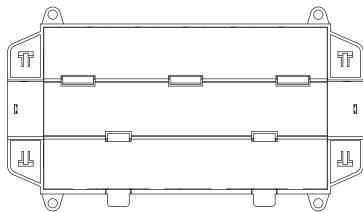
iP-8417/8447



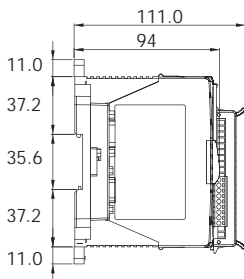
Front View



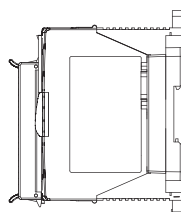
Bottom View



Rear View

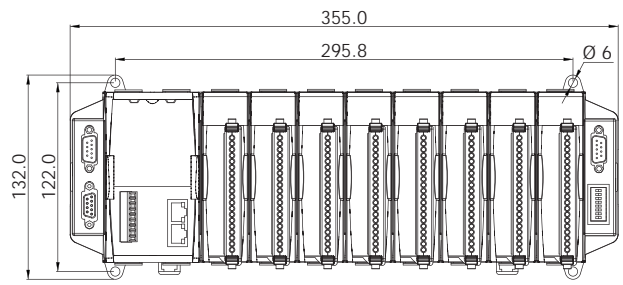


Left Side View

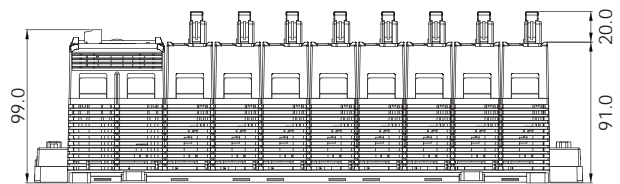


Right Side View

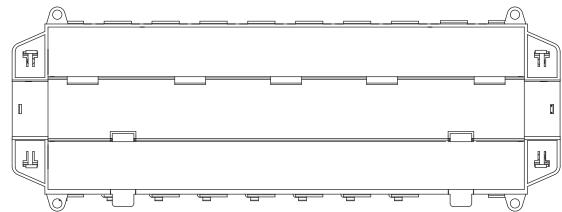
iP-8817/8847



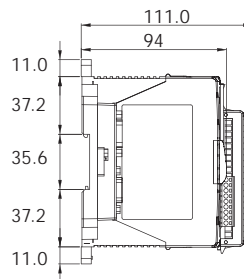
Front View



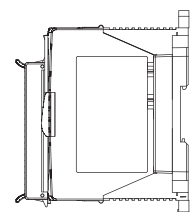
Bottom View



Rear View



Left Side View



Right Side View

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Compact PAC

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iPAC-8000 Series

iP-8417/8817/8447/8847

## Ordering Information

iP-8417 CR	ISaGRAF based iPAC-8000 with 4 I/O Slots (RoHS)
iP-8817 CR	ISaGRAF based iPAC-8000 with 8 I/O Slots (RoHS)
iP-8447 CR	ISaGRAF based iPAC-8000 with 4 I/O Slots (RoHS)
iP-8847 CR	ISaGRAF based iPAC-8000 with 8 I/O Slots (RoHS)

## Accessories

ISaGRAF Development Software	
ISaGRAF-256-E	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with One Application Book (English version) and one USB Dongle
ISaGRAF-256-C	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with One Application Book (Chinese version) and one USB Dongle
ISaGRAF-32-E	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with One Application Book (English version) Note: No upgrade service from ISaGRAF-32 to ISaGRAF-256. (Using ISaGRAF-32 can control more than 32 I/O tags. Please refer to ISaGRAF User's Manual Ch. 3.4)
ISaGRAF-32-C	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with One Application Book (Chinese version) Note: No upgrade service from ISaGRAF-32 to ISaGRAF-256. (Using ISaGRAF-32 can control more than 32 I/O tags. Please refer to ISaGRAF User's Manual Ch. 3.4)
Power Supply	
DP-660	24 V <sub>DC</sub> /2.5 A, 60 W and 5 V <sub>DC</sub> /0.5 A, 2.5 W Power Supply with DIN-Rail Mounting
DP-665	24 V <sub>DC</sub> /2.7 A, 65 W Power Supply with DIN-Rail Mounting
DP-1200 CR	24 V <sub>DC</sub> /5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS)
I-7560 CR	USB to RS-232 Converter (RoHS)